# The big-city bias in access to finance: Evidence from firm perceptions in almost 100 countries

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## Abstract

There is mounting evidence in the developed world to suggest that there is geographical variation in access to finance. At the same time, there is a growing interest in the advantages of major cities in emerging economies in providing better access to services. Yet there is little evidence on spatial variation in access to finance in the developing world. In this paper, we address this gap. We propose that one important function of big cities is to provide better credit markets, but that – as countries develop – this 'big city bias' is likely to decline. We test these hypotheses using data on over 80,000 firms in 97 countries and provide new evidence that firms in large cities – with more than 1 million inhabitants – are less likely to perceive access to capital as a constraint. However, this big city bias in credit markets declines as countries develop.

**Keywords**: Access to finance; Urbanisation; Credit Markets; Cities; Firm financing.

**JEL Codes**: G10; O16; R51

# 1. Introduction

Mounting evidence from the developed world suggests that there are geographical differences in the ability of firms to access finance (Wójcik 2009; Martin, 2011; Xiao & Ritchie 2009; Lee & Brown 2016; Zhao & Jones-Evans 2016). While some suggested that advancements in information and communication technologies would make physical distance less relevant in financial transactions and operations, the spatial concentration of investments and financial institutions in major national and international financial centres has not lessened (Garretsen et al. 2009; Wójcik 2009; Marshall et al. 2012; Wójcik & MacDonald-Korth 2015). There is growing evidence on how the unevenness of capital mobility influences the performance of firms, for which access to finance frequently constitutes a key growth constraint (Beck et al. 2005; Beck & Demirgüç-Kunt 2006; Ayyagari et al. 2008; Chakravarty & Xiang 2013; World Bank 2015). At the same time, there is a widespread interest in the advantages of major urban agglomerations in terms of providing better growth opportunities to individuals and firms (Glaeser and Sims, 2015; Castells-Quintana, 2016; Henderson *et al.*, 2016). Yet, relatively little research has considered the relationship between these two issues: does geography and city size matter for the financing of firms?

This is an important omission both for theory and practice (Engelen & Faulconbridge, 2009). Theoretically, investigating how city size relates to access to finance helps understanding of the economic advantage of cities and also the geographical dimensions of financial markets. While the growing digitalisation of financial markets was predicted to reduce the importance of geography for access to finance, others have suggested that finance may still flow from peripheral to core regions (Clark, 2006; Engelen & Grote, 2009; Wojcik, 2011). As Martin (2011) argues, "The world of global finance is far from 'flat'" (p. 591). For policymakers, ensuring firms have access to finance is a crucial challenge for private sector development. World Bank research suggests that finance is important in ensuring jobs growth (Ayyagari et al., 2016). If access to finance does vary spatially, but finance is important for growth, it is likely to be a factor in persistent uneven development. This issue makes the lack of evidence on the relationship between city size and access to finance an important omission.

In this paper we address this gap. We propose that one of the significant functions of big cities is to provide better credit markets, but that – as countries become more developed – this 'big-city bias' is likely to decline. We test these ideas using a sample of over 80,000 firms in almost

100 countries. We provide new evidence that, controlling for a host of firm characteristics, firms in large cities – defined as those with more than one million inhabitants – are less likely to experience access to finance as a constraint to their operations. Although the analysis cannot entirely rule out potential sorting of firms across space, results are robust against the inclusion of a large series of factors influencing firm's access to finance, and against alternative specifications.

The paper aims to offer three main contributions to the growing literature on the geography of finance, something which was only of marginal interest for some time (Garretsen, Kitson and Martin, 2009) but which has undergone a resurgence since the financial crisis (e.g. Lee et al. 2009; Martin, 2011; Wójcik & MacDonald-Korth 2015). First, despite an abundant and growing literature on access to finance in business and financial economics, significantly less research has considered how it varies geographically. Regional economists, too, have frequently tended to assume no friction of distance across space, and hence no geographical heterogeneity in finance markets (Lee and Brown, 2016). Better understanding the geography of finance in the developing world is important if one considers the significant amount of research on the finance-growth nexus. Although there is still debate on the exact causal direction of such link (inter alia: Shan, Morris and Sun, 2001; Shan, 2005; Rousseau and Wachtel, 2011; Peia and Roszbach, 2015), a significant amount of literature suggests that access to finance may affects firm performance and economic growth (inter alia: Hsueh, Hu and Tu, 2013; Andini and Andini, 2014; Breitenlechner, Gachter and Sindermann, 2015). Cross-country evidence during the last decade has shown how financing constraints emerge as one of the most important and robust underlying factors restraining firm growth (Beck, DemirgüÇ-Kunt and Maksimovic, 2005; Ayyagari, Demirgüç-Kunt and Maksimovic, 2008; Presbitero, Rabellotti and Piras, 2014; Jinjarak and Wignaraja, 2016). Improving access to external sources of funding is indeed one of the main challenges for firm finance in developing countries (Demirgüç-Kunt, Beck and Honohan, 2008). Our contribution adds to the business and financial economics literature by showing how firm financing is influenced not only by the characteristics of firms (inter alia: Beck, Demirgüç-Kunt, & Singer, 2013), but also by their location.

Second, the paper contributes to the growing geographical literature on the spatialities of finance. There has been increased interest in the topic at least since the financial crisis (Lee *et al.*, 2009), yet most of the empirical research in this strand of literature has focused on

developed economies in Europe and North America. As suggested by Chakravarty & Xiang (2013) in the case of borrower discouragement, however, dynamics might work differently in relatively developed versus underdeveloped economies. This gap is particularly relevant considering findings from the macroeconomics and finance literature, according to which the positive impact of finance for growth is higher in low and middle-income countries that are catching up in terms of their productivity levels (inter alia: Rioja & Valev 2004; Aghion et al. 2005; Rousseau & D'Onofrio 2013). Where studies do exist they have focused on a single developed economy, rather than considering cross-county variation (Alessandrini, Presbitero and Zazzaro, 2010; Lee and Brown, 2016). There is hence a need to explore whether theoretical predictions and empirical results from advanced economies are equally valid in the case of emerging countries.

Last but not least, findings can inform the literature on urbanization and development. An increasing body of work has shown the existence of a link between urban agglomerations and development (Martin and Ottaviano, 2001; Henderson, 2003; Duranton and Puga, 2004; Rosenthal and Strange, 2004; Brülhart and Sbergami, 2009; Duranton, 2015; Castells-Quintana, 2016). Our paper aims to contribute to the growing interest in the geographical economics of the developing world (Glaeser and Sims, 2015; Castells-Quintana, 2016; Henderson *et al.*, 2016). In particular, relatively few efforts have been made to empirically explore in details which specific channels may drive the economic growth opportunities offered by large urban agglomerations. The findings of our paper tentatively suggest that access to finance might play a role in such processes.

The article is structured as follows. Section 2 reviews the literature and draws from it a set of hypotheses to test. Section 3 describes the dataset and presents the empirical model, as well as the estimation strategy. Section 4 presents the baseline results, and provides further evidence to test the robustness of our results against potential identification concerns. Section 5 draws the discussion to a conclusion and presents the implications for theory and policy.

## 2. Geographical biases in credit markets and city size

The finance-growth nexus has been at the centre of a significant amount of research. Although there is still debate on the exact causal direction of such link, a consistent body of literature

suggests that access to finance might play a key role for economic growth (Beck, 2013).[1] Financial deepening and financial inclusion – that is, the processes leading to the availability of a wide range of financial services to all creditworthy households and enterprises – may support the real economy by easing economic transactions, mobilizing and pooling savings, improving the allocation of resources, and enabling long-term investments (Levine, 2005). Some contributions question the direction of causality (e.g.: Shan, Morris and Sun, 2001; Shan, 2005; Peia and Roszbach, 2015), or suggest that the finance-growth nexus may follow non-linear, non-monotonic trends (Beck, 2014; Law and Singh, 2014; Arcand, Berkes and Panizza, 2015; Samargandi, Fidrmuc and Ghosh, 2015). Nevertheless, the majority of existing research seems to suggest how financial intermediaries and markets may drive growth – particularly at certain stages of development (Guiso, Sapienza and Zingales, 2004a; Levine, 2005; Hsueh, Hu and Tu, 2013; Rousseau and D'Onofrio, 2013; Andini and Andini, 2014; Breitenlechner, Gachter and Sindermann, 2015) Empirical studies have indeed shown how the availability of external finance is positively associated with entrepreneurship and higher firm entry (Evans and Jovanovic, 1989; Guiso, Sapienza and Zingales, 2004b), faster firm growth (Ayyagari, Demirgüç-Kunt and Maksimovic, 2008; de Guevara and Maudos, 2009; Beck, Lu and Yang, 2015), innovation (Lee, Sameen and Cowling, 2015; Lee and Brown, 2016), and higher exports (Hur, Raj and Riyanto, 2006; Jinjarak and Wignaraja, 2016).

Recent research has further argued that financial deepening is not only conducive to higher growth, but also leads to lower income inequalities, by both allowing the poor to overcome financing constraints, and fostering formal jobs creation through the expansion of the formal economy (Beck, Demirgüç-Kunt and Levine, 2007). The uneven availability of external financing is yet one of the most common and important business obstacles firms have to confront. Research has in particular shown how small and medium-sized enterprises (OECD, 2006; Beck, DemirgüÇ-Kunt and Singer, 2013), as well as younger (Chakravarty and Xiang, 2013) and innovative firms (Lee and Brown, 2016) do not only report higher financing obstacles, but are also more affected by such obstacles in their operations.

[1] While finance can be beneficial for development, it can also have significant negative impacts. The 2008 crisis has clearly put its potential risks under the limelight. As shown by Diamond and Dybvig (1983), the same mechanisms that makes the financial sector growth-enhancing contains the potential 'seed of destruction' (Beck, 2013). It is hence important to understand more in depth how to unlock the positive effects of finance, while mitigating its risks. The current paper is part of the literature aiming to contributing to the first endeavour.

In spite of growing evidence on how financing constraints are influenced by firms characteristics such as age and size, the importance of spatial variation has been underplayed, at least until recently (Dow and Rodríguez-Fuentes, 1997; Pollard, 2003; Garretsen, Kitson and Martin, 2009). Research in economics and business studies has frequently tended to assume perfect interregional capital mobility, and hence no geographical heterogeneity in access to finance. Economic geographers, on the other hand, have started exploring since the late 1990s the spatial concentration of financial markets, pointing to how money tends to flow and accumulate in specific areas rather than spreading evenly across space (Clark, 2005). Contra to arguments about the end of distance in credit markets, the expansion of finance across the globe has not made geography immaterial (Dymski, 2009). Researchers have underlined the potential problems which firms in need of external finance in lagging regions may experience (Klagge and Martin, 2005; Xiao and Ritchie, 2009; Appleyard, 2013; Lee and Cowling, 2013) and, consequently, the role of finance in the (re)production of social and spatial inequalities (Sokol, 2013). Alessandrini, Presbitero, & Zazzaro (2009) show how distance between bank head-quarters and local bank branches – measured both as physical as well as cultural distance – is a positive predictor of firm credit rationing and a negative predictor of firm innovation adoptions. Bellucci, Borisov, & Zazzaro (2013) suggest that the cost of lending, too, increases with distance, as their findings speak of higher interest rates along with higher bank-borrower distance. Lee & Brown (2016) find that, in spite of their higher demand for external financing, innovative firms located in UK peripheral regions are more likely to have their applications for finance rejected.

Work in economic geography has long focused on the notion that financial institutions are not blind to space or place, but instead channel capital into particular areas (Leyshon, 2000). Harvey (2008) argues that international flows of capital can be seen as providing the capital needed for the physical expansion of urbanisation, with cities providing a focal point for speculative development. Major cities are, according to this argument, places where capital is relatively abundant. An important related contribution comes from the work of Thrift (1994) and Leyshon and Thrift (1997) who argue that financial sectors should not be conceived as being about rational economic actors, but rather as centres of networks which are in a state of constant reconfiguration. Individuals are not making rational decisions based on perfect information, but are doing so on the basis of their current connnections and the information which they recieve. Financial sectors are sustained because they remain at the centre of these networks. This network account has implications for our analysis, because big cities are likely

to have denser networks, with firms outside of those less likely to acces the networks and access finance.

As distance influences the costs and access to financing, a related implication is that there may exist agglomeration externalities in clustering in the same location. In other words, there may be a financing bias towards urban agglomerations. This is the hypothesis put forward by Wojcik (2009; 2011) in the case of primary equity markets. Analysing the recent evolutions of global stock markets, he argues that the multitude of economic agents constituting the equity market industry benefit from proximity to each other and, similarly, from proximity to issuers and investors. This gives rise to stock market centres which, in turn, benefit from other kinds of agglomeration economies present in large urban centres. Indeed, the major urban centers can often become focal points in the development of functioning financial markets, providing nodes in both national and international financial flows (Martin, 2011).

The role of urban agglomerations in providing better access to growth-promoting services is a topic which has attracted considerable research and policy attention in recent years. The New Economic Geography (NEG) School, in particular, emphasizes the benefits of urban agglomeration for economic growth (Martin and Ottaviano, 2001; Henderson, 2003). The underlying assumption is that cities, and particularly bigger ones, provide stronger agglomeration economies and, thereby, make people and firms more productive. Urban increasing returns are driven by better learning through the generation and accumulation of new knowledge among economic actors, as well as sharing and matching of labour, infrastructure, and inputs (Duranton and Puga, 2004; Rosenthal and Strange, 2004).[2] These sort of productivity gains are higher at lower levels of development (Duranton, 2015), and in sectors such as service industries (Henderson, 2010).[3] Interestingly, while the NEG literature has not explicitly considered the role of the financial sector in driving spatial agglomeration effects, such relationship was underlined by Williamson (1965) in his seminal work on the dynamics of spatial agglomeration and inequalities and, more recently, by Nogueira *et al.* (2015). In Williamson (1965)'s words:

[2] The NEG frameworks further suggest that the relationship between city size and productivity is not linear but follows an inverted-U shape, in that after a certain threshold congestion costs will outweight the benefits from agglomeration and productivity will start to decrease.

[3] The 2009 World Development Report summarizes well what has become a dominant view in much NEG-inspired economic development policy sphere: "No country has grown […] to high-income without vibrant cities. The rush to cities in developing countries seem chaotic, but it is necessary" (World Bank, 2009, p. 24).

> "External economies and general benefits derived from agglomeration of capital projects in the relatively rich Northern regions may cause capital to emigrate from the South to the North […]. High apparent risk premiums […] and immature capital markets may further depress investment activity and capital accumulation in the South. In the latter, immature development of capital institutions may prove to be not only important but also the most easily measurable of these factors in explaining perverse capital flows. […] Capital migrates mainly through the banking system. […] The result is that deposits of the backward regions are transformed into credits for the industries in the North, particularly for those industries in which the banks participate. But capital migrates also via the capital market" (Williamson, 1965, p. 6/7).

While Williamson's argument is framed on regions (he focuses on rich – 'the North' – and poor – 'the South' – areas), his framework can be applied to the analysis of cities. For instance, in the case of Spain he used as an example (cf. Williamson, 1965, p. 6/7), the rich regions were (mostly) corresponding to the urban areas around Madrid and Barcelona. In sum, there is growing evidence in the developed world to suggest that there are geographical differences in the ability of firms to access finance. At the same time, there is a growing interest in the advantages of major cities in emerging economies in terms of providing better access to services. Yet, relatively little research has considered the relationship between these two issues, and asked whether geography and city size matter for the financing of firms. Drawing on Wojcik's (2009; 2011) work, and combining these two separate strands of literature, our main empirical hypothesis states

*$H_1$: Firms in big cities are likely to experience lower financing constraints.*

We identify six groups of factors which might explain such big-city bias in access to finance.

*Tacit knowledge sharing and face-to-face contact between actors*. Although banks increasingly use automated and computerized lending decisions based on 'hard information' on the financial performance of the firm, lending continues to be influenced in some places by discretion on whether to approve/reject financing requests. Lending still involves tacit knowledge, that is, knowledge that requires frequent face-to-face interaction and does not flow freely across space (Gertler, 2003; Storper and Venables, 2004). Cities or regions may develop communities in which this tacit knowledge is shared, with financiers better able to identify suitable firms, and, on the demand side, firms making better applications to more suitable funders (Zook, 2004).

Research from Italy (Bofondi and Gobbi, 2003) and the USA (Agarwal and Hauswald, 2010), for example, suggest that distance reduces a lender's ability to collect soft intelligence about applicants. Guiso et al. (2004, p. 937) quote a speech by the president of the Italian Association of Bankers, according to whom "the banker's rule-of-thumb is to never lend to a client located more than three miles from his office".

Studies at the bank level have shown that proximity between financial institutions and lenders does not only increase the likelihood of funding, but also help obtain a more favourable treatment in terms of borrowing costs (Petersen and Rajan, 2002; Bellucci, Borisov and Zazzaro, 2013). Alessandrini et al. (2009) further suggest that the geographical heterogeneity in access to finance is shaped by two different types of distance: *operational distance*, that is, the distance between banks' lending branches and local borrowers; and *functional distance*, which measures the 'internal' distance between a local branch and the bank headquarter. Under this perspective, large cities might be advantaged on both aspects, as they offer a larger and physically closer pool of lenders/borrowers, while are also more likely to host both banks' branches and headquarters. Particularly if major cities are more likely to be home to the headquarters of banks, loans made within them may be cheaper to monitor and more likely to be made. This 'home bias' in lending would make it easier for firms in urban centres to access finance (Alessandrini et al., 2009). In sum, compared to rural areas and small cities, bigger urban agglomerations may reduce transaction costs, agency problems, and information space frictions.

*Local competition among banks*. Second, the higher concentration of lending organizations in bigger cities might lead to higher local competition and hence lower borrowing costs. This might be particularly relevant since physical distance acts as an important force shaping (local) financial markets segmentation (Guiso, Sapienza and Zingales, 2004b). The literature indeed suggests that a larger number of banks and branches per inhabitants reduces information asymmetries, and positively affects the availability of credit to local firms and their performance (Benfratello, Schiantarelli and Sembenelli, 2008; Cornaggia *et al.*, 2015).

*Collateral*. Third, research in real estate finance has shown how, in presence of financing constraints, the ability to pledge collateral enhances a firm's debt capacity. By providing external investors with the option to liquidate pledges, collateral also acts as a disciplining device on borrowers. Asset liquidation values hence play an important role in determining a firm's debt capacity, and variations in the value of real estate can have a significant impact on

external financing. As an example, Chaney, Sraer, & Thesmar (2012) show how an appreciation by 1 USD in the value of a firm's real estate generates investment increases by approximately 6 cents. Such investment is financed through additional debt issues, and the impact of real estate value on investment is even stronger for firms which are credit constrained. We might hence expect that bigger cities, where real estate stocks are larger and (likely) more valuable, might ease access to finance by an increased collateral provision. Thicker markets in cities might also make urban real estate easier to sell, and so more attractive to lenders who are reluctant to take on assets with low liquidity.

*Path dependency and cumulative causation*. Last but not least, a further potential explanatory channel comes from the literature on the *spatial fix* of finance (Hall 2012; Sokol 2013). Cumulative causation, as well as mimicry among lenders, may lead to finance flowing to the main urban centres where it is already abundant, even if such behaviour is not efficient. The result might be that finance pours more easily to core areas considered more successful, even if firms in such areas are not significantly different from the ones in smaller and more peripheral cities. This might happen if, for example, bank management faces incentives to invest in a similar manner to others, rather than taking positions which leave them looking isolated. This reflects a view that financial markets are not always perfectly efficient, but that ideas or concepts may become fashionable, leading to group behaviour (Zook, 2004; Wójcik et al. 2013). Such patterns became visible for example in the UK in the aftermath of the 2008 financial crisis when, faced with an opaque and intricate financial system, a 'herd instinct' (Lee and Brown, 2016) led banks to follow strategies relatively similar to each other. In this context, particular cities may be seen as good 'bets' for investment and smaller cities may have less hype around them.

*Banks' liquidity preferences*. Relatedly, Nogueira *et al.* (2015) argue that banks have spatially differentiated liquidity preferences – that is, the level to which they decide to set the ratio between investments and liquidity. Such ratio is informed by their expectations and degree of uncertainty regarding the future, the institutional framework, and the state of the economy. The lower the liquidity preference, the higher will be the supply of credit. In more peripheral locations – where centrality is proxied by the population of the urban centre – the economic environment will be more uncertain and, hence, lenders in those places will tend to prefer keeping more liquid assets than ones in large centres (Dow, 1987). In turn, this will reduce credit availability, or make it more expensive. By contrast, high centrality means, ceteris

paribus, a higher economic diversification and, in turn, the possibility for banks to better diversify their portfolios (Nogueira *et al.*, 2015).

*Networks.* Last but not least, drawing on work in economic geography we also argue that finance is often distributed through spatially bound networks (Thrift, 1994; Leyshon and Thrift, 1997). Major cities will sometimes become the focal points in these networks, which can provide important information in allowing firms and entrepreneurs access to providers of capital. Firms outside the networks find it harder to access the capital necessary to access the finance they need.

While there are theoretical reasons to posit that firms' access to finance might be linked to city size, we can also expect the intensity and extent of such relationship to be contingent on a country's level of development (Davis and Henderson, 2003). Numerous scholars have argued that the link between urbanisation and economic growth follows a non-linear trend (Brülhart and Sbergami, 2009), with urban concentration being particularly conducive to growth in middle stages of economic development. Theories which predict this relationship explicitly consider the role of capital markets, which will have limited reach in early stages of development (Brülhart and Sbergami, 2009). Reviewing the literature, Duranton (2015) concludes that productivity increases are likely to be higher in developing countries than in advanced economies. Again, Williamson (1965)'s seminal paper on spatial inequalities directly acknowledged how, after a certain level of development, capital markets might become less concentrated and start spreading to peripheral cities and regions. While his point is not explicitly about cities, he does consider inter-country differentials in his work (Williamson, 1965, p. 6/7).

Relatedly, the most recent literature on the finance-growth nexus suggests that the impact of finance on economic development will also differ by development stage. A common finding among this body of work is that such nexus may follow an inverted-U shaped function, with finance having a positive effect on growth only at intermediate levels of financial development (Samargandi, Fidrmuc and Ghosh, 2015). A similar relationship might be observed with geographical variation. At low levels of development, access to finance is hard for firms everywhere. At mid-levels of development, finance is available but only for firms in 'core' geographical areas such as major cities. At high levels of development, financial markets are effective enough to reach outside major cities. Empirical support for this comes from studies which show that the financial sector may impede national growth beyond medium levels of

economic development (Aghion, Howitt and Mayer-Foulkes, 2005) and may even have a negative impact after a certain threshold (Arcand, Berkes and Panizza, 2015). Focusing on the different levels of financial development, Rioja and Valev (2004) suggest that finance has a positive effect on growth only in areas at intermediate levels of financial development. In their view this effect is attributed to scale and diminishing returns effects in the financial sector. Beck (2014) provides a somehow similar explanation, as he suggests that more mature financial systems may focus on providing credit to households, rather than firms, and may be characterized by rent seeking behavior. This literature has no spatial dimension. However, if the financial sector has most impact at mid-levels of development, and cities are also providing the location for the finance-growth nexus to operate, this may show up in a differential effect for urban firms. Drawing on such insights, our second research hypothesis states

*$H_2$: The relationship between firm contraints in access to finance and city size is contingent on a country level of development, and follows and inverted-U curve.*

The remainder of the article will aim to empirically test whether our theoretical predictions find confirmation in the data.

## 3. Research design

### Data

To answer our research hypotheses, we use data from the World Bank Enterprise Surveys (WBES).[4] Enterprise Surveys have collected data from firms around the world since 2002. Countries are surveyed every 3 to 4 years but not simultaneously. Following Beck, Demirgüç-Kunt, & Singer (2013) we only use data from the standardized dataset 2006-2015, which contains comparable cross-country data for more than 120.000 firms across 135 countries. The number of enterprises surveyed in each country depends on the size of each economy.[5] Each country's sample is chosen to be representative of the non-agricultural, formal private economy (hence firms with less than 5 employees are discarded). Samples are stratified according to two-digit ISIC sectors, as well as firm size. Sub-national regional variability is considered by

[4] The World Bank, Enterprise Surveys, http://www.enterprisesurveys.org, accessed in March 2016.

[5] The sample size is intended to be large enough to conduct statistically robust analyses with levels of precision at a minimum 7.5% precision for 90% confidence intervals.

including the main industrial areas in each country, while for very large economies the sample is also stratified at the regional level. Thus, we focus on city size as our unit of analysis with a principal attention on the distinction between what we define as 'big cities', that is, those with more than one million inhabitants, and others.

Due to gaps in the data on some of our key variables of interest, our final sample includes nearly 80.000 firm-level observations from four continents and 97 countries. We intentionally exclude a set of small states (e.g. Antigua and Barbuda, Fiji, Guyana, Guyana, Samoa, and Tonga) which are potentially too small to provide enough between-city variation.[6] Appendix 1 provides a list of the countries included in the analysis, while Appendix 2 and 3 respectively offer key summary statistics for each variable, and a matrix with pairwise correlation coefficients.

**Model and estimation strategy**

In order to explore the link between city size and access to finance we adopt the following empirical specification:

$$FIN_{i,j,c,s,t} = \beta 1\ CITY_{j,c,t} + \beta 2\ FIRM_{i,j,c,s,t} + \alpha_c + n_s + \gamma_t + \varepsilon \qquad (1)$$

where (*i*, *j*, *c*, *s* and *t* respectively denote firms, cities, countries, sectors, and years): $FIN_{i,j,c,s,t}$ is an ordinal categorical variable measuring the extent to which each firm *i* reports access to financing as a constraint to its business operation; $CITY_{j,c,t}$ includes our variables of interest, and is aimed at testing whether firms' financing constraints differ across cities of different size; $FIRM_{i,j,c,s,t}$ is a vector of variables controlling for key observable characteristics of the establishment; $\alpha_c$, and $n_s$ are respectively country and two-digit ISIC sector fixed-effects, included to control for idiosyncratic differences across nations (e.g. different levels of income) and industries; $\gamma_t$ are year fixed-effects, included since surveys were conducted across different periods; $\varepsilon$ is the error term.

[6] Empirically, we drop from the analysis countries for which the dataset includes less than 200 firm-level observations. It is worth remembering that the number of observations for each country is a function, along other parameters, of its size.

Our main empirical strategy is to estimate equation (1) adopting an ordinal logit estimator with country, sector, and year fixed effects. To control for potential heteroscedasticity and spatial autocorrelation, estimations adopt robust standard errors adjusted for clustering at country level.

An important caveat needs to be stressed. Our identification strategy follows the common approach used in the literature on access to finance. Nevertheless, such methodology does not allow to fully rule out potential biases linked to the sorting of firms across space (Mion and Naticchioni, 2009). In other words, we cannot entirely rule out the hypothesis that more/less productive firms may endogenously locate in different cities, and that such firms' intrinsic differences may also be driving the results on access to financing. This potential omitted-variable bias (OVB) is – alas – common to most of the literature. We address such issue at our best, by controlling for an extensive set of firms characteristics. Furthermore, in the final part of the paper we provide further anecdotal evidence suggesting how potential sorting effects should not be a key concern for the analysis.

It must also be stressed that the current research takes the characteristics of existing cities as given. In the long term and in a more general equilibrium setting, city size is itself endogenous, since potentially influenced by firms' performance. In the short term, however, this should not be a concern. The current analysis should hence be interpreted as an exploration of the heterogeneity of financial constraints across existing cities, conditional on urban agglomerations being in place.

## Variables and definitions

*Dependent variable*

*Access to financing*. Firms interviewed by the Enterprise Surveys are asked to rate the extent to which access to financing, which includes the availability and cost (interest rates, fees and collateral requirements), constitutes no obstacle, a minor obstacle, a major obstacle, or a very severe obstacle to the current operations of the establishment. Our dependent variable is hence a categorical variable ranging from 0 to 4, where higher values indicate more serious constraints. In the construction of the dependent variable we follow earlier contributions from the literature (Beck, DemirgüÇ-Kunt and Maksimovic, 2005; Ayyagari, Demirgüç-Kunt and

Maksimovic, 2008). We choose to use perception data for two reasons. Firstly, while many studies focus on firms who formally apply for finance from banks or other institutions, this misses out those who are reliant on other sources of finance (e.g. family or the entrepreneurs own finance). This might be particularly relevant in developing economies. Firm perceptions help us assess a braoder range of firms than just those who have applied for finance and helps to alleviate concerns that different national propensities to apply have affected the results. Secondly, perception data is included in the World Bank Enterprise Survey data in a standardised format across most samples, so using this variable maximises sample size. There are a number of studies which successfully use perception data (Iammarino, Sanna-Randaccio and Savona, 2009; Lee, 2014), however, as with any indicator it has some limitations. The most obvious problem is that the results may reflect cultural norms in particular countries and economic sectors – although, given the range of countries in the sample, and the use of country and sectoral dummies, this is unlikely to significantly affect the results. While these limitations need to be born in mind, perceived access to finance provides the best potential dependent variable for comparative work.

*City characteristics*

*City size*. The Enterprise Surveys provide information on whether firms are located in cities with: less than 50.000, between 50.000 and 250.000, between 250.000 and one million, and over one million inhabitants.[7] We hence construct a categorical variable based on such data, where the smallest cities are the baseline category. Out of our final sample of 81.378 firms, 42.8% are located in cities with more than one million inhabitants, 27% in cities with a population between 250.000 and one million, 17.6% in cities between 50.000 and 250.000, and 12.6% in cities below 50.000. Alas, due to the nature of the data we cannot control for more fine-grained geographical determinants. While this is a potential limitation of the Enterprise Surveys dataset, we are somehow comforted by the work of Wojcik (2009), who suggests that the most important difference in access to finance is likely to be linked to the divide between provincial areas and large (financial) centres.[8]

[7] Unfortunately the data does not include a more specific city size variable.

[8] The dataset reports the categorical size of the city where each firm is located, but does not provide the exact name of the city. For each firm observation the Surveys also provide a 'Region string' name (677 unique values in our sample). Yet, such identifiers are frequently broad, meaning that in more than half of the cases each of them

*Capital city*. Capital cities may be special in several ways – they may represent relatively sheltered economies, as government spending is maintained in periods of economic weakness, or they may be politically favoured with government investment. To control for these possibilities, we add a dummy for firms located in the capital city.[9]

*Firm characteristics*

The second group of explanatory variables relates to a set of features which the literature identifies as key determinants of firms' ability to access finance (inter alia: Beck et al. 2013; Chakravarty & Xiang 2013; Presbitero et al. 2014).

*Establishment size*. Estiblishment size constitutes one of the most relevant predictors of financing constraints (Beck & Demirgüç-Kunt 2006). We construct dummy variables for small (5-19 employees), medium (20-99 employees) and large (100 and more employees) establishments.

*Firm age*. The literature has shown how age is another key determinant of access to finance, with younger firms being more likely capital constrained. The variable is measured in the number of years since the establishment began operations, and is expressed in natural logarithms.

*Sole proprietorship*. The variable is constructed as a dummy equal to one if the establishment is owned by a single individual. We expect firms with multiple owners to have access to a broader range of financial providers and personal finance, and so be less likely to perceive credit constraints.

*State-ownership*. Particularly in emerging countries, ownership by the state may significantly influence access to finance by providing preferential access to public lenders. The variable is constructed as the percent of firm owned by governments or the state.

includes firms located in more than one city-size. It is hence difficult to exactly ascertain how many urban centers over one million inhabitants are included in our analysis. Our estimates suggest that the number of such cities ranges between 23.5 and 49% of the sample. For comparison, in 2016, there were 512 cities with at least 1 million inhabitants globally (UN DESA 2016). Their distribution is spread relatively evenly across all continents. In the same year, 23% of the world's population lived in cities with a population of > 1 million, a steady increase from 19% in 1995 and a continual upward trajectory since 1960 (14%) (ibid.). By 2030, a projected 662 cities will have at least 1 million residents (ibid.).

[9] Political capitals and primate financial centres do not always coincide. Due to data availability, however, this is the best strategy we can implement.

*Publicly-listed*. The variable is constructed as a dummy equal to one if the firm is publicly listed, and is included since such firms might find it easier to access finance.

*Female-ownership*. Research has pointed to a potential gender divide in firm financing (Presbitero, Rabellotti and Piras, 2014). We hence add a dummy equal to one if any of the firm owners are female. While this may ignore some variation in multi-owned enterprises, it should at least partially control for gender differences in the availability of credit.

*Foreign-ownership*. Last but not least, different internationalization ownership levels may significantly influence financing constraints, with international firms being more able to leverage financial resources (Beck, DemirgüÇ-Kunt and Singer, 2013). The variable is constructed as the percent of firm owned by private foreign individuals, companies or organisations.

*Export*. Similarly, export-prone firms may experience differences in access to financing. The variable is constructed as the percent of sales exported either directly or indirectly (i.e. sold domestically to third parties that exports products). Because exporting is normally considered a sign of success, and would be indicative of quality management, we expect exporting to be negatively related to problems accessing finance.

*Management experience*. Management experience is likely to influence access to financing. Since the Enterprise Surveys do not include specific questions about management skills, we proxy the variable by the number of years of experience that the top management have working in the firm's sector. The variable is expressed in natural logarithms.

*Firm productivity*. Following Baccini, Impullitti, & Malesky (2015), we measure labour productivity as value added per worker, that is, firm's revenue over the firm's number of employees. As customary, the variable is expressed in natural logarithms to mitigate the impact of outliers. Due to lack of information in the WBES on part-time employees, in the construction of the variable we are forced to consider permanent full-time employees only. Furthermore, the variable is not available for a large sub-sample of firms. Therefore, we will present results both including and excluding it from the analysis.

# 4. **Results**

**Baseline results**

Tables 1 and 2 present the main results. In Table 1, the first column shows the baseline outputs (including country and year fixed-effects), while in columns two and three we gradually include firm controls and sector fixed-effects. In column four, five and six we then test the robustness of the results when respectively including city size as a continuous variable, adding a dummy for the financial crisis and its interaction with city-size, and further controlling for firms' productivity. Model five is our preferred specification, as it strikes the best balance between the number of controls included and the maximum sample size.

**[TABLE 1 ABOUT HERE]**

As can be observed, empirical results support the first research hypothesis, according to which a big-city bias exists making it easier for firms in large urban areas to access finance. Across all specifications, firms located in cities with more than one million inhabitants are significantly less likely to experience financing constraints than establishments in centres with a population lower than 50.000 inhabitants (that is, the baseline category). Interestingly, the link between financing constraints and city size is weak and insignificant for all other urban centres whose population ranges between 50.000 and one million. In other words, the urban bias in access to financing seems to be exclusively related to big urban agglomerations. In particular, the big-city $\beta$ coefficient in column five (-0.307) suggests that, holding other variables constant, for a firm in a large city compared to one in a small town the odds of being in a lower category of financing constraints are 1.36, that is, almost 36 % lower. Results further show how the big-city bias is not linked to capital cities. Indeed, the coefficient for political capitals is highly insignificant across all models.[10]

The coefficients for the firm controls show results in line with the literature. Establishment size, age, ownership, and internationalisation are all significantly correlated to financing constraints perception. Confirming earlier literature (inter alia: Beck, Demirgüç-Kunt, & Singer, 2013), our results suggest that, on average, firms which are larger, older, foreign-owned, and export-oriented are less likely to perceive access to finance as a limitation.

[10] One potential problem here is that the results may be determined by some omitted variable which is correlated with location in a big city, such as availability of collateral or internal finance. Our use of extensive controls helps address this concern, although we cannot fully rule it out. Future research using data on firm balance sheet may be able to do so.

Some of the countries were surveyed during the economic recession triggered by the financial crisis which started in the US in 2007 and spread globally the following year (Lane and Milesi-Ferretti, 2010; Milio *et al.*, 2014; Crescenzi, Luca and Milio, 2016). The inclusion of year fixed-effects should help controlling for cross-sectional common potential impacts of the global recession on firms' access to finance. To further test the robustness of our results to such shock, [11] in models five and six we add a dummy for the years of the crisis (2008 to 2011), as well as its interaction with our city-size variable. Interestingly, when controlling for such extra variable and its interaction our main coefficient for large cities increases in significance and magnitude. Our explanation for it is that bigger cities have been hit more severely by the crisis and, hence, not including the effect of the downturn would determine a downward bias.[12] Such a result is expected, as there is increasing evidence suggesting how, compared to more 'sheltered' cities, urban and regional economies more open to the international economy (as likely are bigger cities in emerging economies) behave in a more cyclical way: they grow more in periods of economic booms, but also suffer more in periods of decline (cf. Fratesi and Rodríguez-Pose, 2016).[13]

Last but not least, While in models two to five we control for an extensive stock of firm characteristics, in column six we add a measure of firm performance, namely productivity per full-time worker. Results show that the inclusion of the extra variable does not significantly alter the coefficients for city-size.[14]

Our second research hypothesis posited that the link between city size and access to finance might be non-linear and dependent on countries' level of economic development. To test such hypothesis, we re-estimate Table 1's models three, four and six stratifying the sample according to countries' per-capita Gross Domestic Product (GDP) levels in the survey year.[15] We stratify the sample instead of including an interaction between city-size and GDP levels because of the

[11] We thank one anonymous referee for raising such key point.

[12] As a matter of fact, results not presented here but available on request show that the coefficient for the interaction between city-size and the crisis is positive and significant at the 10% level, meaning that the effects of the financial crisis were perceived more severely in larger cities.

[13] The existence of 'boom and bust' effects in the value of assets used as collateral in accessing credit might also explain our finding (we thank one anonymous referee for underlining such point).

[14] Tests not presented but available on request show that results equally hold when further adding a variable measuring firm's total annual sales (expressed in Ln) into the regressions. We prefer not to include such variable from the main results because of its high pairwise correlation with productivity (0.88, significant at the 5% confidence level).

[15] In doing so we use income data from the World Bank.

worringly high multicollinearity between the latter and the country fixed-effects. In particular, we split the sample in three groups drawing on the thresholds set by the Organisation for Economic Cooperation and Development (OECD) in the 2014 List of Official Development Aassistance (ODA) Recipients.[16]

**[TABLE 2 ABOUT HERE]**

Table 2 presents the results. Such outputs provide preliminary evidence in support of the second hypothesis. They suggest that the big-city bias in access to financing is only moderately significant in countries with a per-capita GDP below 4.146 PPP USD (column one). It is strongest between 4.100 and 12.700 PPP USD, and turns completely insignificant above the latter threshold. Interestingly, our findings are somehow in line with the ones by Brülhart and Sbergami (2009) on the link between city-size and economic growth. The two authors suggest that urban agglomeration boosts economic growth up to countries' per-capita GDP level of around 10.000 USD. Tests not presented but available on request show how results hold when India and China, included in the second groups, are excluded from the regressions. Similarly, they also show that results are virtually unchanged when adding productivity as an extra control among the regressors.

Overall, results suggest that relatively developed economies, with stronger and better functioning financial systems, have less of a bias towards large cities than less developed economies. This finding accords with theories which suggest that agglomeration is most associated with development in mid-levels of income, where financial markets are only developing and their influence may extend only to the major cities (Brülhart and Sbergami, 2009). In more developed countries with more mature financial systems, access to capital is likely to be more widespread, although regional variation may still exist for certain types of firm (Lee and Brown, 2016).

One potential alternative interepretation of the results is that large cities are faster growing, with the firms within them then being less credit constrained. It is beyond the scope of this paper to identify this relationship precisely, however we feel this alternative hypothesis is unlikely for two reasons. Firstly, given the mounting evidence in the developed world that finance clusters spatially our results seem in some senses unsurprising. Secondly, because cities

[16] The list can be reached at: https://www.oecd.org/dac/stats/documentupload/DAC%20List%20of%20ODA%20Recipients%202014%20final.pdf, accessed on 9 September 2016.

in the developing world are not, actually, synonymous with economic growth. As Fay and Opal (2000) note, many cities in the developing world have faced the prospect of urbanisation without growth – cities may grow in terms of population but not necessarily in output terms.

**Robustness checks**

Baseline results have provided evidence in support of both the first and the second research hypotheses. The following section will test the robustness of such findings against four potential concerns.

First, our dependent variable measures the extent to which firms perceive access to financing – which includes availability as well as costs such as interest rates, fees, collateral requirements – as a constraint to their current operations. The perception of potential constraints, however, may be influenced by the firms' level of interaction with lenders and financing organisations. Because of this, we re-estimate columns three to six of Table 1 adding, among the controls, a binary variable measuring whether the establishment applied for loans or lines of credit in the year before the survey. This is done on the idea that firms which have had interactions with credit organisations may have a different perception of financing markets than others which did not. Results are presented in Table 3. The first four columns report the same results of Table 1's models three to six, while the last four control for the additional regressor. Results uncover a strong and significant correlation between applying for a loan and perceiving access to finance as a constraint. Yet, as can be observed, the magnitude and statistical significance of the city-size coefficients are virtually unchanged. Furthermore, as it can be seen, columns five to eight show a strongly positive and statistically significant correlation between having applied for lines of credit and firms' perception of financing constraints. Such result also offers prima-facie evidence to reject the alternative hypothesis that financing constraints might be driven by a weak demand for credit rather than by a lack of supply (as our conceptual framework instead assumes).

**[TABLE 3 ABOUT HERE]**

A second and most important concern is the potential sorting of firms across space. While we control for an extensive stock of firm characteristics, we cannot entirely rule out the hypothesis that more/less productive firms endogenously decide to open their plants in cities of different

size. If this was the case, our results might suffer from an omitted-variable bias, since intrinsic differences in firms' performance might also be driving the results on access to financing. Alas we don't have the data to entirely rule out such potential risk. Our approach to provide at least preliminary evidence against such potential bias is to explore whether there is any correlation between firms' economic performance and city-size.[17] We hence re-estimate Equation 1 replacing the initial dependent variable with annual total sales, as well as productivity per full-time worker (PPW), two measures of firm productivity which are available in the WBES. If strong spatial sorting effects were concretely occurring, we would expect to find a correlation between firm performance and city-size. The results presented in Table 4 suggest that this is not the case. Neither firm sales (expressed in natural logarithm), nor PPW, show a statistically significant relation with any of the city-size categories. In other words, Table 4 provides preliminary – although not conclusive – evidence that potential sorting effects based on firm performances should not be a key concern for the analysis.

**[TABLE 4 ABOUT HERE]**

Third, the analysis excluded very small countries from the analysis, on the ground that they might not provide sufficient sub-national city-size variation.[18] As a robustness test, we further restrict the sample, by ranking countries according to the number of observations available in the WBES, and then dropping the lowest 10 percent. Regression outputs, presented in Table 5, show how winsorising the sample does not alter the initial results.

**[TABLE 5 ABOUT HERE]**

Fourth, in the main analysis we have controlled for the potential effects of the financial crisis by interacting the 2008-2011 dummy with city-size. Yet, if the financial crisis also affected core characteristics of the firm independently of the firm's location, results might still suffer from an omitted variable bias. As a robustness test we hence re-estimate our models interacting the crisis dummy with all regressors. The new outputs are presented in Appendix 4. The first three columns report three specifications where we only interact the crisis dummy with city-size. In columns 4, 5, and 6 we then add the full list of interactions. As it can be seen, results are very similar to the ones of models 1, 2, and 3.

[17] Clearly, we are still unable to control for potential self-selection of firms driven by unobservable characteristics.

[18] Tests not presented but available on request show that including all countries in the analysis does not alter the results.

Fifth, to further test the robustness of results agains potential omitted variable biases, we run an additional check where we control for the quality of the local 'business institutional environment'. This is done following recent pieces of research underlying the importance of institutional quality for financial development (Filippidis and Katrakilidis, 2015), and for the finance-growth nexus to be positive (Law, Azman-Saini and Ibrahim, 2013). We re-estimate our models adding, among the controls, four variables available from the Enterprise Surveys. These consist in the extent to which firms perceive as constraints to their operations: crime, corruption, courts functioning, and obtaining business permits. Results are presented in Appendix 5. The extra variables are only available for a subset of firms. Columns 1 to 4 hence report the last four models of Table 1 estimated with the restricted sample. Columns 5 to 8 then control for the extra variables. Results show a positive correlation between perceived access to finance and institutional quality. More importantly, the inclusion of the extra controls does not undermine but, rather, increases both significance and magnitude of the city-size coefficients.

Last but not least, the ordinal logistic model adopted in the analysis assumes that the $\beta$'s coefficients of the explanatory variables are the same for all values of the ordinal dependent variable – what is called the proportional odds assumption. Under such assumption, the only right-hand side parameters to change across the values of the left-hand side ordinal variable are the specific intercepts $\alpha$'s, that is, the cutoff points. Yet, the assumption is frequently violated, as it is common for one of the $\beta$'s to differ across values of the dependent variable (Williams, 2006). To test for the robustness of our results against such potential issue, we re-estimate model five from Table 1 adopting Williams (2006)'s generalized ordered logit model. Such estimator has the advantage of fitting models that are less restrictive of the ordinal logit (when the parallel-lines assumption is not met) but more interpretable and parsimonious than those fitted by the non-ordinal, multinomial logistic regression. We run the command using the autofit option, which automatically identifies the explanatory variables for which the parallel-lines assumption is not met (hence relaxing it) while still calculating unique $\beta$ coefficients for the variables for which the assumption holds. As suggested by Williams (2006), we chose a particularly stringent level of significance (0.01) in order to avoid the risk of missing any potential violations of the assumption.[19] Results are presented in Appendix 6. Column one reports the ordinal logit results, while columns two to five present the generalized ordinal logit estimates. As in any multinomial logit estimation, column two contrasts the dependent

[19] Tests not presented but available on request show that results don't change if altering the level of significance to either 0.05 or 0.001.

variable's category 0 with categories 1, 2, 3, and 4. Column three contrasts categories 0 and 1 with categories 2, 3, and 4. Column four contrasts categories 0, 1, 2 with categories 3 and 4. Finally, column five contrasts categories 0, 1, 2, 3 with category 4. Coefficients which are constant across all four columns indicate that explanatory variable does not violate the proportional odds assumption. As it can be seen, the only variable for which this is not the case is firm size (as expected, the negative correlation between firm size and financial constraints is stronger for higher levels of constraints).

## 5. Conclusion

One of the most important themes in the economic geography literature has been the role of cities in economic development. At the same time, there has been growing interest in spatial variations in access to finance, with authors arguing that finance can reflect and so perpetuate patterns of advantage between core regions and peripheral areas. Yet, while recent work has begun to consider these issues of spatial variation, these studies have been limited to a single country and no work has considered how the economic benefits of large cities, so prominent in the urbanisation literature, influence the financing of firms. In this paper we have used a large scale firm-level dataset to investigate these issues and address two interrelated questions: is there a big-city bias in credit markets? And does this apply at all levels of development?

We find strong evidence that firms in large cities are less likely to perceive credit constraints, a result which is robust to the inclusion of a wide range of controls and different model specifiations. We believe this finding helps understand the economic advantages of cities, and adds new global-scale evidence to the emerging literature on the geography of finance. While we cannot precisely identify the channels through which this effect operates, our theoretical framework suggests how large cities may allow competition between financial providers, the development of specialist finance, better availability and measurement of collateral, and the sharing of information. A combination of these factors makes it easier for firms in large cities to access finance than those elsewhere.

However, we also find that this relationship varies by level of development. Relatively developed economies, with stronger and better functioning financial systems, seem to have less of a bias towards large cities than less developed economies. This finding accords with theories which suggest that agglomeration is most associated with development in mid-levels of

income, where financial markets are only developing and their influence may extend only to the major cities (Brülhart and Sbergami, 2009). In more developed countries with more mature financial systems, access to capital is likely to be more widespread, although regional variation may still exist for certain types of firm (Lee and Brown, 2016).

Our results provide a number of potential areas for future research. In particular, further work may seek to narrow down on the factors driving these trends. We set out a series of theoretical ideas which may be driving these results, but future research could usefully begin to dissect our findings. For example, work could investigate whether there were significant differences according to the financial system of different countries with, for example, more decentralized financial systems having less of an urban bias. Doing so might become feasible should big data develop to allow researchers to develop consistent, local indicators of bank diversity. Moreover, our data limits us to broad indicators of city size, meaning we miss many geographical nuances. It might be, for example, that smaller cities near to major agglomerations provide some of the financial advantages of big cities. An important future contribution could be to use advances in mapping technologies or administrative data to develop a more detailed view on how geography influences capital markets. Related to this, future work may also wish to investigate the specific channels through which large cities facilitate these exchanges of capital. In particular, global cities or those which serve as command and control points in the global economy may be particularly favoured (Sassen, 1991). Finally, our research show variation in the ability of firms to access finance in large cities. Future research may want to see if the same benefits apply to households in urban areas.

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## Tables

**Table 1.** City size and constraints in access to financing: Robust ordinal logit estimates.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| City > 1M | -0.241** | -0.231** | -0.211** | | -0.307** | -0.287** |
| | (0.111) | (0.112) | (0.106) | | (0.128) | (0.137) |
| City 250K < 1M | -0.0240 | -0.0288 | -0.0100 | | -0.0740 | -0.0440 |
| | (0.0770) | (0.0773) | (0.0776) | | (0.0926) | (0.0978) |
| City 50 < 250K | -0.0561 | -0.0559 | -0.0514 | | -0.0895 | -0.0672 |
| | (0.0549) | (0.0553) | (0.0549) | | (0.0586) | (0.0615) |
| City (cont.) | | | | -0.0730* | | |
| | | | | (0.0412) | | |
| Capital city | 0.0828 | 0.106 | 0.109 | 0.104 | 0.0616 | 0.0703 |
| | (0.0804) | (0.0833) | (0.0809) | (0.0811) | (0.0782) | (0.0774) |
| M-S size | | -0.0741*** | -0.0996*** | -0.101*** | -0.0998*** | -0.0836*** |
| | | (0.0266) | (0.0257) | (0.0257) | (0.0257) | (0.0234) |
| L size | | -0.231*** | -0.264*** | -0.268*** | -0.266*** | -0.246*** |
| | | (0.0389) | (0.0364) | (0.0367) | (0.0364) | (0.0357) |
| Age | | -0.0485** | -0.0512*** | -0.0510*** | -0.0505*** | -0.0574*** |
| | | (0.0192) | (0.0192) | (0.0191) | (0.0192) | (0.0182) |
| Foreign-owned | | -0.00481*** | -0.00469*** | -0.00469*** | -0.00470*** | -0.00441*** |
| | | (0.000429) | (0.000420) | (0.000427) | (0.000424) | (0.000446) |
| State-owned | | -0.00215 | -0.00182 | -0.00184 | -0.00187 | -0.00258 |
| | | (0.00247) | (0.00256) | (0.00256) | (0.00255) | (0.00269) |
| Publicly listed | | -0.0365 | -0.0264 | -0.0251 | -0.0237 | -0.00534 |
| | | (0.0620) | (0.0604) | (0.0600) | (0.0597) | (0.0574) |
| Single proprietor | | 0.0605** | 0.0596** | 0.0617** | 0.0623** | 0.0382 |
| | | (0.0257) | (0.0249) | (0.0248) | (0.0248) | (0.0282) |
| Women owners | | -0.0126 | -0.00310 | -0.00295 | -0.00286 | -0.00597 |
| | | (0.0239) | (0.0255) | (0.0251) | (0.0257) | (0.0292) |
| Export | | 5.19e-05 | -0.000949** | -0.000950** | -0.000915* | -0.00103* |
| | | (0.000438) | (0.000474) | (0.000482) | (0.000480) | (0.000589) |
| Manager exp. | | 0.00274 | -0.0138 | -0.0147 | -0.0134 | -0.0100 |
| | | (0.0177) | (0.0176) | (0.0174) | (0.0177) | (0.0189) |
| Productivity | | | | | | -0.0582*** |
| | | | | | | (0.0141) |
| Observations | 81,378 | 81,378 | 81,378 | 81,378 | 81,378 | 70,447 |
| Country FE | yes | yes | yes | yes | yes | yes |
| Year FE | yes | yes | yes | yes | yes | yes |
| Firm controls | | yes | yes | yes | yes | yes |
| Sector FE | | | yes | yes | yes | yes |
| Crisis controls | | | | | yes | yes |
| Pseudo R2 | 0.0442 | 0.0469 | 0.0494 | 0.0491 | 0.0495 | 0.0516 |

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. City-size baseline category: cities with less than 50K inhabitants. Constant cuts are not reported.

**Table 2.** City-size and constraints in access to financing: Robust ordinal logit estimates stratified by per-capita GDP groups (PPP USD): up to 4.125, between 4.126 and 12.735, above 12.735.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| | Low/Low-middle | | | Upper-middle | | | High | | |
| City > 1M | -0.374* | | -0.403 | -0.420*** | | -0.547*** | 0.0426 | | -0.0639 |
| | (0.206) | | (0.263) | (0.112) | | (0.0879) | (0.127) | | (0.186) |
| City 250K < 1M | -0.179 | | -0.206 | -0.0919 | | -0.149 | 0.0603 | | 0.00403 |
| | (0.225) | | (0.264) | (0.0822) | | (0.0922) | (0.133) | | (0.188) |
| City 50K < 250K | -0.214 | | -0.222 | -0.0700 | | -0.118* | -0.0675 | | -0.0864 |
| | (0.181) | | (0.206) | (0.0687) | | (0.0654) | (0.0749) | | (0.0782) |
| City (cont.) | | -0.110** | | | -0.155*** | | | 0.0244 | |
| | | (0.0534) | | | (0.0480) | | | (0.0495) | |
| Capital city | 0.448*** | 0.456*** | 0.433*** | 0.179 | 0.167 | 0.158* | -0.116 | -0.113 | -0.187 |
| | (0.143) | (0.144) | (0.152) | (0.109) | (0.107) | (0.0899) | (0.122) | (0.123) | (0.133) |
| Observations | 17,690 | 17,690 | 14,995 | 36,009 | 36,009 | 32,184 | 27,679 | 27,679 | 23,268 |
| Country FE | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| Year FE | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| Sector FE | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| Firm controls | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| Crisis controls | | | yes | | | yes | | | yes |
| Productivity | | | yes | | | yes | | | yes |
| Pseudo R-squared | 0.0497 | 0.0495 | 0.0488 | 0.0341 | 0.0336 | 0.0369 | 0.0445 | 0.0444 | 0.0436 |

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. City-size baseline category: cities with less than 50K inhabitants. Firm controls and constant cuts are not reported. All regressions include the list of controls as in Tables 1.

**Table 3.** City size and constraints in access to financing, controlling for whether a firm applied for external finance. Robust ordinal logit estimates.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| City > 1M | -0.211** | | -0.307** | -0.287** | -0.216** | | -0.302** | -0.277** |
| | (0.106) | | (0.128) | (0.137) | (0.103) | | (0.127) | (0.138) |
| City 250K < 1M | -0.0100 | | -0.0740 | -0.0440 | -0.00823 | | -0.0658 | -0.0322 |
| | (0.0776) | | (0.0926) | (0.0978) | (0.0798) | | (0.0951) | (0.100) |
| City 50K<250K | -0.0514 | | -0.0895 | -0.0672 | -0.0583 | | -0.0924 | -0.0652 |
| | (0.0549) | | (0.0586) | (0.0615) | (0.0534) | | (0.0583) | (0.0615) |
| City (continuous) | | -0.0730* | | | | -0.0735* | | |
| | | (0.0412) | | | | (0.0393) | | |
| Capital city | 0.109 | 0.104 | 0.0616 | 0.0703 | 0.109 | 0.105 | 0.0666 | 0.0774 |
| | (0.0809) | (0.0811) | (0.0782) | (0.0774) | (0.0789) | (0.0794) | (0.0764) | (0.0753) |
| Loan application | | | | | 0.516*** | 0.515*** | 0.516*** | 0.522*** |
| | | | | | (0.0408) | (0.0409) | (0.0407) | (0.0408) |
| Observations | 81,378 | 81,378 | 81,378 | 70,447 | 79,334 | 79,334 | 79,334 | 69,029 |
| Country FE | yes | yes | yes | yes | yes | yes | yes | yes |
| Year FE | yes | yes | yes | yes | yes | yes | yes | yes |
| Sector FE | yes | yes | yes | yes | yes | yes | yes | yes |
| Firm controls | yes | yes | yes | yes | yes | yes | yes | yes |
| Crisis controls | | | yes | yes | | | yes | yes |
| Productivity | | | | yes | | | | yes |
| Pseudo R2 | 0.0494 | 0.0491 | 0.0495 | 0.0516 | 0.0537 | 0.0535 | 0.0539 | 0.0560 |

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. City-size baseline category: cities with less than 50K inhabitants. Firm controls and constant cuts are not reported. All regressions include the list of controls as in Tables 1.

**Table 4.** Firm performance and city size: Robust OLS estimates.

| | Total sales in previous year | | | Productivity per worker | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| City > 1M | 0.0401 | -0.0466 | | -0.00999 | -0.0871 | |
| | (0.126) | (0.140) | | (0.126) | (0.140) | |
| City 250K < 1M | 0.0537 | 0.000953 | | 0.0336 | -0.0134 | |
| | (0.0886) | (0.0971) | | (0.0879) | (0.0962) | |
| City 50K<250K | 0.0661 | 0.0455 | | 0.0368 | 0.0184 | |
| | (0.0517) | (0.0514) | | (0.0443) | (0.0448) | |
| City (cont.) | | | -0.0256 | | | -0.0366 |
| | | | (0.0521) | | | (0.0518) |
| Capital city | | 0.198*** | 0.194*** | | 0.176** | 0.173** |
| | | (0.0739) | (0.0735) | | (0.0693) | (0.0688) |
| Constant | 16.87*** | 16.92*** | 16.84*** | 15.15*** | 15.19*** | 15.04*** |
| | (1.428) | (1.432) | (1.280) | (1.459) | (1.465) | (1.308) |
| Observations | 71,746 | 71,746 | 71,746 | 71,534 | 71,534 | 71,534 |
| Country FE | yes | yes | yes | yes | yes | yes |
| Year FE | yes | yes | yes | yes | yes | yes |
| Sector FE | yes | yes | yes | yes | yes | yes |
| Firm controls | yes | yes | yes | yes | yes | yes |
| R-squared | 0.7467 | 0.7471 | 0.7470 | 0.7111 | 0.7114 | 0.7114 |

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. City-size baseline category: cities with less than 50K inhabitants. Firm controls and constant are not reported. All regressions include the list of controls as in Tables 1.

**Table 5.** City size and constraints in access to financing, excluding small countries from the analysis. Robust ordinal logit estimates.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| City >1M | -0.252** | -0.245** | -0.224** | | -0.293** | -0.293** |
| | (0.114) | (0.115) | (0.109) | | (0.139) | (0.139) |
| City 250K < 1M | -0.0226 | -0.0290 | -0.00947 | | -0.0387 | -0.0387 |
| | (0.0809) | (0.0812) | (0.0815) | | (0.103) | (0.103) |
| City 50K < 250K | -0.0528 | -0.0531 | -0.0490 | | -0.0614 | -0.0614 |
| | (0.0579) | (0.0582) | (0.0580) | | (0.0648) | (0.0648) |
| City (continuous) | | | | -0.0782* | | |
| | | | | (0.0427) | | |
| Capital city | 0.110 | 0.135 | 0.134 | 0.127 | 0.103 | 0.103 |
| | (0.0880) | (0.0910) | (0.0887) | (0.0888) | (0.0854) | (0.0854) |
| Observations | 76,987 | 76,987 | 76,987 | 76,987 | 66,489 | 66,489 |
| Country FE | yes | yes | yes | yes | yes | yes |
| Year FE | yes | yes | yes | yes | yes | yes |
| Firm controls | | yes | yes | yes | yes | yes |
| Sector FE | | | yes | yes | yes | yes |
| Crisis controls | | | | | yes | yes |
| Firm productivity | | | | | | yes |
| Pseudo R2 | 0.0432 | 0.0457 | 0.0481 | 0.0478 | 0.0502 | 0.0502 |

Small countries are identified as the ones in the lowest $10^{th}$ percentile of number of firms sampled. Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. City-size baseline category: cities with less than 50K inhabitants. Firm controls and constant cuts are not reported. Regressions include the list of controls as in Tables 1.

# Appendices

**Appendix 1.** List of countries included in the empirical sample.

| Countries | | |
|---|---|---|
| Albania | Honduras | Paraguay |
| Argentina | Hungary | Peru |
| Armenia | India | Philippines |
| Azerbaijan | Indonesia | Poland |
| Bangladesh | Iraq | Romania |
| Belarus | Israel | Russia |
| Bhutan | Jamaica | Rwanda |
| Bolivia | Jordan | Senegal |
| Bosnia and Herzegovina | Kazakhstan | Serbia |
| Botswana | Kenya | Slovak Republic |
| Brazil | Kosovo | Slovenia |
| Bulgaria | Kyrgyz Republic | South Africa |
| Burkina Faso | Laos | South Sudan |
| Cameroon | Latvia | Sri Lanka |
| Chile | Lebanon | Sudan |
| China | Lithuania | Sweden |
| Colombia | Madagascar | Tajikistan |
| Costarica | Malawi | Tanzania |
| Croatia | Mali | Trinidad and Tobago |
| Czech Republic | Mauritius | Tunisia |
| Ivory Coast | Mexico | Turkey |
| Democratic Republic of Congo | Moldova | Uganda |
| Djibuti | Mongolia | Ukraine |
| Dominican Republic | Montenegro | Uruguay |
| Equador | Morocco | Uzbekistan |
| Egypt | Mozanbique | Venezuela |
| El Salvador | Myanmar | Vietnam |
| Estonia | Namibia | West Bank and Gaza |
| Ethiopia | Nepal | Yemen |
| FYR Macedonia | Nicaragua | Zambia |
| Georgia | Nigeria | Zimbabwe |
| Ghana | Pakistan | |

**Appendix 2.** Summary statistics and variable definitions.

| | Definition | Mean | Std. deviation | Min | Max |
|---|---|---|---|---|---|
| Financing obstacles | Evaluation of extent to which access to finance, including availability and cost, interest rates, fees and collateral requirements, is an obstacle to current operations | 1.495 | 1.331 | 0 | 4 |
| City-size | Categorical variable indicating whether a firm is located in cities with: less than 50.000 (1), between 50.000 and 250.000 (2), between 250.000 and one million (3), and over one million inhabitants (4). | 2.999 | 1.052 | 1 | 4 |
| Capital city | Dummy equal to 1 if city is a capital | 0.171 | 0.376 | 0 | 1 |
| Establishment size | Categorical variable equal to: 1 if a firms is small (5-19 employees); 2 if medium (20-99 employees); 3 if large (100 and more employees) | 1.755 | 0.767 | 1 | 3 |
| Age | Ln years since the establishment began operations | 2.580 | 0.842 | 0 | 5.829 |
| Foreign-owned | Percent of firm owned by private foreign individuals, companies or organisations | 6.876 | 23.485 | 0 | 100 |
| State-owned | Percent owned by governemnts or the state | 0.740 | 6.663 | 0 | 100 |
| Publicly-listed | Dummy equal to 1 if the firm is publicly listed | 0.051 | 0.220 | 0 | 1 |
| Single proprietor | Dummy equal to 1 if the establishment is owned by a single individual | 0.348 | 0.476 | 0 | 1 |
| Women-ownership | Dummy equal to 1 if at least one of the owners is female | 0.288 | 0.453 | 0 | 1 |
| Export | Percent of sales exported either directly or indirectly (i.e. sold domestically to third parties that exports products) | 10.361 | 25.635 | 0 | 100 |
| Manager experience | Ln of the number of years of experience that the top management have working in the firm's sector | 2.604 | 0.765 | 0 | 4.174 |
| Firm productivity | Firm's revenue over the firm's number of employees, expressed in Ln. Due to lack of information in the WBES on part-time employees, in the construction of the variable we consider permanent full-time employees only. | 13.568 | 2.669 | -3.401 | 29.002 |
| Firms sales | Total Ln annual sales in previous year | 16.867 | 3.060 | 0 | 33.846 |

**Appendix 3.** Pairwise correlations among variables

| | A2F | City-size | Capital | Firm size | Age | Foreign | State | Listed | Single | Women | Export | Manager | Ppwa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A2F | 1.000 | | | | | | | | | | | | |
| | (0.000) | | | | | | | | | | | | |
| City-size | 0.0320* | 1.000 | | | | | | | | | | | |
| | (0.000) | (0.000) | | | | | | | | | | | |
| Capital | 0.0522* | 0.3018* | 1.000 | | | | | | | | | | |
| | (0.000) | (0.000) | (0.000) | | | | | | | | | | |
| Firm size | -0.1025* | 0.0592* | 0.0524* | 1.000 | | | | | | | | | |
| | (0.000) | (0.000) | (0.000) | (0.000) | | | | | | | | | |
| Age | -0.0487* | 0.0241* | 0.0668* | 0.2477* | 1.000 | | | | | | | | |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | | | | | | | | |
| Foreign | -0.0433* | 0.0089* | 0.0722* | 0.1668* | -0.0149* | 1.000 | | | | | | | |
| | (0.000) | (0.011) | (0.000) | (0.000) | (0.000) | (0.000) | | | | | | | |
| State | -0.0193* | -0.0133* | -0.017* | 0.0834* | 0.0520* | -0.004 | 1.000 | | | | | | |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.235) | (0.000) | | | | | | |
| Listed | -0.0148* | -0.0069* | 0.0469* | 0.1599* | 0.1064* | 0.0577* | 0.1202* | 1.000 | | | | | |
| | (0.000) | (0.050) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | | | | | |
| Single | 0.0699* | 0.0946* | -0.100* | -0.2795* | -0.0967* | -0.1203* | -0.0637* | -0.170* | 1.000 | | | | |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | | | | |
| Women | -0.0290* | -0.0239* | -0.008* | 0.0420* | 0.0518* | -0.0433* | 0.0424* | 0.0584* | -0.1781* | 1.000 | | | |
| | (0.000) | (0.000) | (0.019) | (0.000) | (0.000) | (0.000) | (0.000) | 0.000 | (0.000) | (0.000) | | | |
| Export | -0.0547* | -0.0309* | -0.022* | 0.2477* | 0.0518* | 0.1923* | 0.0199* | 0.0361* | -0.1082* | 0.0305* | 1.000 | | |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | | |
| Manager | -0.0155* | 0.0103* | 0.0798* | 0.1050* | 0.4047* | -0.0192* | -0.0084* | 0.0089* | -0.1164* | 0.0473* | 0.0528* | 1.000 | |
| | (0.000) | (0.003) | (0.000) | (0.000) | (0.000) | (0.000) | (0.017) | (0.011) | (0.000) | (0.000) | (0.000) | (0.000) | |
| Ppwa | -0.0307* | 0.1142* | 0.0683* | 0.0524* | 0.0258* | 0.0787* | 0.0350* | -0.012* | 0.007 | -0.0113* | 0.001 | -0.0279* | 1.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.002) | (0.057) | (0.003) | (0.823) | (0.000) | (0.000) |

**Appendix 4.** City size and constraints in access to financing: controlling for the interaction of the financial crisis dummy with all regressors.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| City < 1M | -0.307** | | -0.287** | -0.309** | | -0.292** |
| | (0.128) | | (0.137) | (0.128) | | (0.137) |
| City 250K < 1M | -0.0740 | | -0.0440 | -0.0750 | | -0.0470 |
| | (0.0926) | | (0.0978) | (0.0924) | | (0.0978) |
| City 50K < 250K | -0.0895 | | -0.0672 | -0.0906 | | -0.0716 |
| | (0.0586) | | (0.0615) | (0.0581) | | (0.0608) |
| City (continuous) | | -0.103** | | | -0.104** | |
| | | (0.0478) | | | (0.0481) | |
| Capital city | 0.0616 | 0.0578 | 0.0703 | 0.0606 | 0.0570 | 0.0707 |
| | (0.0782) | (0.0795) | (0.0774) | (0.0782) | (0.0796) | (0.0776) |
| Observations | 81,378 | 81,378 | 70,447 | 81,378 | 81,378 | 70,447 |
| Country FE | yes | yes | yes | yes | yes | yes |
| Year FE | yes | yes | yes | yes | yes | yes |
| Sector FE | yes | yes | yes | yes | yes | yes |
| Firm controls | yes | yes | yes | yes | yes | yes |
| Firm productivity | | | yes | | | yes |
| Crisis#city | yes | yes | yes | yes | yes | yes |
| Crisis#controls | | | | yes | yes | yes |
| Pseudo R-squared | 0.0495 | 0.0493 | 0.0516 | 0.0495 | 0.0493 | 0.0516 |

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. City-size baseline category: cities with less than 50K inhabitants. Firm controls and constant cuts are not reported. All regressions include the list of controls as in Tables 1.

**Appendix 5.** City size and constraints in access to financing: controlling for firms' perception of the quality of institutions.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| City >1M | -0.202* | | -0.314** | -0.281* | -0.227*** | | -0.321*** | -0.300*** |
| | (0.118) | | (0.144) | (0.155) | (0.0827) | | (0.0956) | (0.104) |
| City 250K < 1M | -0.00204 | | -0.0779 | -0.0380 | -0.00324 | | -0.0668 | -0.0430 |
| | (0.0801) | | (0.0999) | (0.104) | (0.0646) | | (0.0754) | (0.0796) |
| City 50K < 250K | -0.0534 | | -0.0983 | -0.0738 | -0.0797 | | -0.117** | -0.101* |
| | (0.0571) | | (0.0624) | (0.0650) | (0.0499) | | (0.0508) | (0.0530) |
| City (continuous) | | -0.0699 | | | | -0.0747** | | |
| | | (0.0462) | | | | (0.0337) | | |
| Capital city | 0.103 | 0.0983 | 0.0505 | 0.0571 | 0.0542 | 0.0495 | 0.00948 | 0.0190 |
| | (0.0869) | (0.0865) | (0.0817) | (0.0808) | (0.0720) | (0.0714) | (0.0723) | (0.0731) |
| Crime | | | | | 0.285*** | 0.285*** | 0.285*** | 0.283*** |
| | | | | | (0.0314) | (0.0315) | (0.0314) | (0.0344) |
| Corruption | | | | | 0.135*** | 0.134*** | 0.134*** | 0.135*** |
| | | | | | (0.0251) | (0.0250) | (0.0254) | (0.0249) |
| Courts | | | | | 0.104*** | 0.104*** | 0.105*** | 0.102*** |
| | | | | | (0.0124) | (0.0127) | (0.0125) | (0.0139) |
| Business permits | | | | | 0.296*** | 0.296*** | 0.296*** | 0.296*** |
| | | | | | (0.0238) | (0.0239) | (0.0237) | (0.0245) |
| Observations | 73,457 | 73,457 | 73,457 | 63,924 | 73,457 | 73,457 | 73,457 | 63,924 |
| Country FE | yes | yes | yes | yes | yes | yes | yes | yes |
| Year FE | yes | yes | yes | yes | yes | yes | yes | yes |
| Sector FE | yes | yes | yes | yes | yes | yes | yes | yes |
| Firm controls | yes | yes | yes | yes | yes | yes | yes | yes |
| Crisis controls | | | yes | yes | | | yes | yes |
| Productivity | | | | yes | | | | yes |
| Pseudo R-squared | 0.0506 | 0.0503 | 0.0508 | 0.0531 | 0.0918 | 0.0915 | 0.0920 | 0.0930 |

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. City-size baseline category: cities with less than 50K inhabitants. Firm controls and constant cuts are not reported. All regressions include the list of controls as in Tables 1.

**Appendix 6.** City size and constraints in access to financing: Comparing robust ordinal logit (column 1) with generalized multinomial logit estimates (columns 2 to 5).

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Ordinal logit | Generalized ordinal logit | | | |
| | | Cat. 0 vs. 1,2,3,4 | Cat 0,1 vs. 2,3,4 | Cat. 0,1,2 vs. 3,4 | Cat. 0,1,2,3 vs. 4 |
| City > 1M | -0.307** | -0.302** | -0.302** | -0.302** | -0.302** |
| | (0.128) | (0.136) | (0.136) | (0.136) | (0.136) |
| City 250K < 1M | -0.0740 | -0.0628 | -0.0628 | -0.0628 | -0.0628 |
| | (0.0926) | (0.0883) | (0.0883) | (0.0883) | (0.0883) |
| City 50K<250K | -0.0895 | -0.0766 | -0.0766 | -0.0766 | -0.0766 |
| | (0.0586) | (0.0548) | (0.0548) | (0.0548) | (0.0548) |
| Capital city | 0.0616 | 0.0837 | 0.0837 | 0.0837 | 0.0837 |
| | (0.0782) | (0.0773) | (0.0773) | (0.0773) | (0.0773) |
| M-S size | -0.0998*** | -0.0236 | -0.0904*** | -0.157*** | -0.207*** |
| | (0.0257) | (0.0260) | (0.0290) | (0.0285) | (0.0394) |
| L size | -0.266*** | -0.186*** | -0.278*** | -0.348*** | -0.341*** |
| | (0.0364) | (0.0363) | (0.0440) | (0.0462) | (0.0603) |
| Age | -0.0505*** | -0.0564*** | -0.0564*** | -0.0564*** | -0.0564*** |
| | (0.0192) | (0.0193) | (0.0193) | (0.0193) | (0.0193) |
| Foreign-owned | -0.00470*** | -0.00483*** | -0.00483*** | -0.00483*** | -0.00483*** |
| | (0.000424) | (0.000403) | (0.000403) | (0.000403) | (0.000403) |
| State-owned | -0.00187 | -0.00213 | -0.00213 | -0.00213 | -0.00213 |
| | (0.00255) | (0.00281) | (0.00281) | (0.00281) | (0.00281) |
| Publicly listed | -0.0237 | -0.0400 | -0.0400 | -0.0400 | -0.0400 |
| | (0.0597) | (0.0631) | (0.0631) | (0.0631) | (0.0631) |
| Single proprietor | 0.0623** | 0.0569** | 0.0569** | 0.0569** | 0.0569** |
| | (0.0248) | (0.0259) | (0.0259) | (0.0259) | (0.0259) |
| Women owners | -0.00286 | -0.0159 | -0.0159 | -0.0159 | -0.0159 |
| | (0.0257) | (0.0247) | (0.0247) | (0.0247) | (0.0247) |
| Export | -0.000915* | -0.000477 | -0.000477 | -0.000477 | -0.000477 |
| | (0.000480) | (0.000481) | (0.000481) | (0.000481) | (0.000481) |
| Manager exp. | -0.0134 | 0.000881 | 0.000881 | 0.000881 | 0.000881 |
| | (0.0177) | (0.0189) | (0.0189) | (0.0189) | (0.0189) |
| Observations | 81,378 | 81,378 | 81,378 | 81,378 | 81,378 |
| Country FE | yes | yes | yes | yes | yes |
| Year FE | yes | yes | yes | yes | yes |
| Sector FE | yes | yes | yes | yes | yes |
| Crisis controls | yes | yes | yes | yes | yes |
| Pseudo R2 | 0.0495 | 0.0647 | 0.0647 | 0.0647 | 0.0647 |

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. City-size baseline category: cities with less than 50K inhabitants. Firm controls and constant cuts are not reported. All regressions include the list of controls as in Tables 1.